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Orientation and Characteristics of Subject Service in Basic Natural Science Based on the Investigation in Wuhan University, China

Hu Yongsheng
Wuhan University, yshu@lib.whu.edu.cn

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(Wuhan University Library, China,yshu@lib.whu.edu.cn)

Abstract: After investigating service requirements in basic natural science disciplines in Wuhan University, China,we analyze the characteristics according to the survey results,then provide the service strategies suitable for the science subject service.Five colleges in Wuhan University,including physics,chemistry,biology,mathematics,and environment, were investigated.The questionaires include the frequency of science users using the library or the department reference room, how to get the resources for research, main document types used in the library or the department reference room, satisfaction rate in subject resources, training demand of science users,choice of service pattern,user's expectation of subject librarian's work place,the effective communication way between subject librarians and science users,science users' expectation to the department reference room.

Questionnaires were issued in two ways: First, the librarians sent the questionnaires to teachers and students, 217 valid questionnaires were obtained; Second, the librarians look for relevant graduate or undergraduate students in the reading room and other places, 109 valid questionnaires were received.Five respondents averaged in each college.

In all,326 valid questionnaires were obtained and analyzed.We propose that in science subjects service, first,we should carry out targeted services according to the user demands, user psychology, user experience, pay attention to the user's real and potential needs, and avoid "supply and demand imbalance" or "surplus".Then we should think how to guarantee the science disciplines' subject service.The cooperation ability,the personal knowledge management, search capabilities of the subject librarians are important.A service team including preliminary subject librarians, service-oriented librarians, research subject librarians should be constructed. At last ,we should explore the training pattern and contents suitable for the science users, focus on training teachers' information retrieval ability, then teachers can instruct their students to some extent. To design the training contents,we can emphasize guidelines for manuscript submission, sci-tech novelty retrieval，document management software.

Keywords: Subject Services；Basic Natural Science；User Survey

1 Background and Reasons of Investigation according to Subjects

According to subject services' practice,users in different subjects such as basic natural science or social science are different in information needs, or training needs,or habit of using resources.Because of the user demand's difference,we initiated the investigation of subject service in basic natural science,in order to plan and orientate the subject service in basic natural science.

2 Investigation Methods in Basic Natural Science

Five colleges in Wuhan University,including physics,chemistry,biology,mathematics,and environment were investigated. In all,326 valid questionnaires were obtained and analyzed.

The questionaires were issued to undergraduate students,graduate students and faculty in proportion to 2:5:3. There are two issue ways: First, the librarians sent the questionnaires to teachers and students, 217 valid questionnaires were obtained; Second, the librarians look for relevant graduate or undergraduate students in the reading room and other places, 109 valid questionnaires were received.Five respondents averaged in each college. Statistics and analysis of ten main questions are made in the following.

3 Needs Investigation and Analysis of Subject Services in Natural Science Users

3.1 Usage Frequency of the Library or the Department Reference Room

Our concern is whether science users use the library or the department reference room under network environment and how frequently science users use the library or the department reference room**.** The survey(Table 1**)** shows that science users use the library or the department reference room one or two times every week,indicating science users still need the library or the department reference room**.** That the percentage of never using the library is 11.3 and the percentage of never using the department reference room is 26.3 shows we should try our best to advertise the resources of the library or the department reference room**.**

Table 1 Usage Frequency of the Library or the Department Reference Room

frequency	**using the library**		**using the department reference room**	
	quantity	percentage	quantity	percentage
one or two times every week	146	44.8	96	31.2
one or two times every month	70	21.5	70	22.7
Nearly everyday	39	12.0	6	1.9
never visiting	37	11.3	81	26.3
one or two times every semester	34	10.4	55	17.9

3.2 How to Get the Resources for Research or Learning

Under network environment,users have various methods to obtain resources,such as free online resources; commercial database purchased by the library; reading in the library or the department reference room; getting help from the community.It can be seen from Table 2 that as there are more open access journals and professional portals, science users more often search free resources by the search engine.Access to commercial databases ranks the second, indicating that science users take full advantage of commercial databases of the discipline. Using paper books or journals in the library or the department reference room is also a major way. We should know the teacher often recommends the students academic literature, showing the literature transmission between the professional teachers and the students.

Table 2 How to get the resources for research or learning

how to get the resources for research	**quantity**
access free online resources	231
access commercial resources	210
reading paper literature in library	172
literature coming from my teathers	85
reading paper literature in the department reference room	78

buying paper literature	66
seldom or never using literature	13
help from my classmates	3
help from forum	1

3.3 Main Document Types Used in the Library or the Department Reference Room

What science users use most commonly in the library is the electronic database, followed by Chinese or foreign paper books. According to figure 1, Chinese and foreign paper journals in the reference room are used more than in the library. But Chinese paper books and electronic resources in the library are used more than in the reference room. This shows that the library and the reference room should be different in the resource development. It is necessary for the library to develop electronic databases and more paper books in Chinese; The reference room should develop more paper journals.

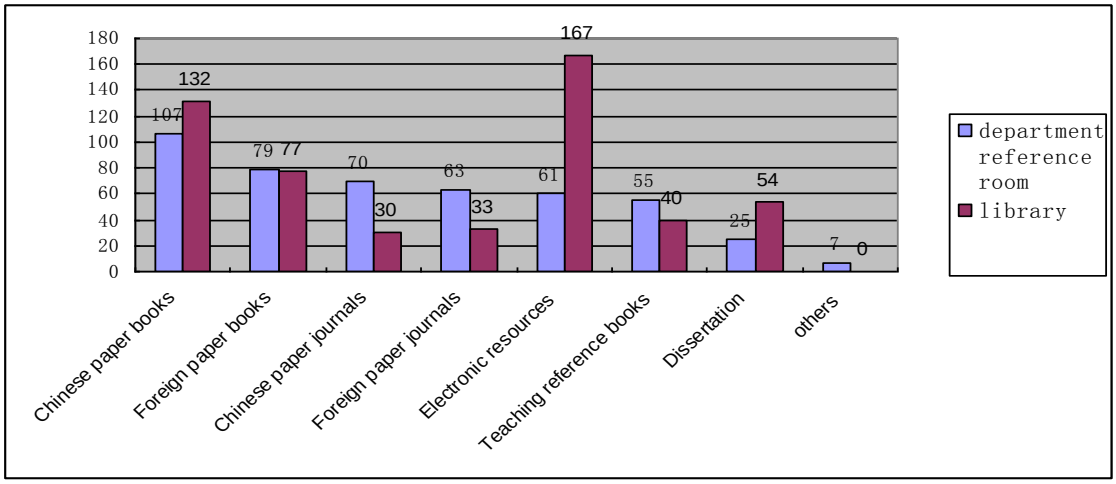

Figure 1 Main Document Types Used in the Library or the Department Reference Room

3.4 The Satisfaction Rate Survey in Subject Resources towards Science Users

It can be seen from Figure 2 and Figure 3 that the satisfaction rate of the subject resources reaches 83% in the library or the department reference room, showing the majority of science users are satisfied. But 13% of users say that the library rarely satisfies their needs and they also recommend supplementary resources,such as European and Japanese electronic databases, Nature Research Journals or Nature Reviews, more subscription of foreign original books.5% of them say the department reference room never satisfies their needs. They suggest the department reference room subscribe more new books and collect complete monograph.

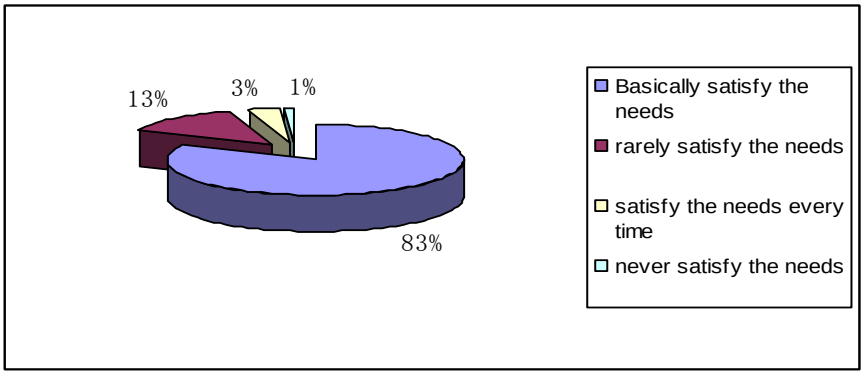

Figure 2　Satisfaction Rate in Subject Resources from Library

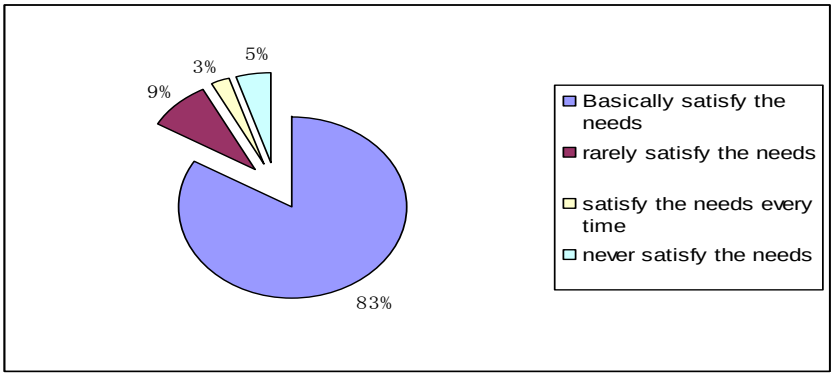

Figure 3　Satisfaction Rate in Subject Resources from Department Reference Room

3.5 Training Demand of Science Users

Table 3 shows the training demand of science users. A training demand for guiding manuscript submission of SCIE、EI、CPCI source journals or conferences ranks the first(14.8%), followed by submission training of core journals(10.8%),which is decided by Chinese scientific evaluation system,because the published articles collected in SCIE、EI、CPCI is an important prerequisite in the natural science student graduation of master and docter degree.Skill training of searching and utilizing various resource follows behind, including free resources(9.7%), academic electronic resources (9.6%), sci-tech novelty retrieval methods（9.3%）,which reflects a strong demand of science users for retrieval skill.Paper writing specifications,document management software(such as Noteexpress,Endnote,etc.), also account for a considerable proportion.

Table 3　Training Demand of Science Users

training demands	**quantity**	**percentage**
guidelines for manuscript submission of SCIE、EI、CPCI source journals or conferences	184	14.8
submission of core journals	134	10.8
free resources	121	9.7
retrieving methods of academic electronic resources	119	9.6
sci-tech novelty retrieval methods	116	9.3
paper writing specifications	113	9.1
methods to use library resources and　services	110	8.8
document management software	94	7.6

impact analysis for scientific achievements	91	7.3
document delivery and interlibrary loan	85	6.8
patent application	78	6.3

3.6 The Effective Instructing Mode to Science Users

Table 4 shows in promoting resource searching skills, what helps them most, unexpectedly, is the professional teacher's instruction(32.3%). From the communication between subject service and professional teachers, we know that professional teachers are very familiar with the professional database,they have strong ability to search information and often recommend the students literature,and the teachers and students in the science laboratory exchange literature or idea nearly every week. The training given by the subject librarians and other librarians account respectively for 20.2% and 18.1%. Self-study library's training course is 16.2%, and one-to-one Instruction by subject librarian is 13.2%.

Table 4 The Effective Instructing Mode to Science Users

effective Instructing Mode	quantity	percentage
professional teachers' instruction	139	32.3
training given by subject librarians	87	20.2
training given by other librarians	78	18.1
self-study library's training course	70	16.2
one-to-one Instruction by subject librarian	57	13.2

3.7 Choice of Service Pattern to Science Readers

From the survey（Figure 4）, science users think that the subject librarians only instructing their searching methods is the best way(36.6%). That the subject librarians directly providing subject information and literature ranks last. This shows in subject service, we should not only "give a man a fish", but also "teach a man to fish". "Teaching a man to fish" is more important, because they can have the searching technology in the future. Similarly, we can see the instruction from the teacher or the help from classmates is very important to the science users. Therefore, It is vital to improve the information searching capability of the science teachers and researchers.The users who answer "I can search information myself and don't need help at all" account for 14.9%. The majority of them are senior undergraduates or graduates.They have much experience to search information and are quite familiar with the subject information and search skills, or they have attended literature search class or training class organised by the library.

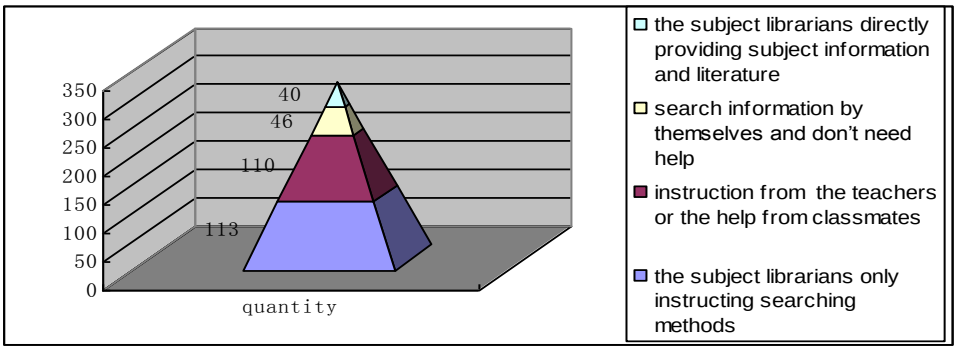

Figure 4 Choice of Service Pattern to Science Readers

3.8 Users' expectation of the Subject Librarian's Work place

Which place to work,in the library or the department reference room, can the subject librarian play a better role? From the figure 3,The vast majority of users think it's better if there are subject librarians provide service both in the library and the department reference room(47%). 19% of them think the subject librarians should serve in the library,whereas 16% think the subject librarian should work in the department reference room.18% think the subject librarian should rotate in the library and the department reference room.From the investigation results, it can be seen that if human resource is abundant in the library, the subject librarian can serve both in the library and the department reference room. If human resource is not enough, the subject librarian can rotate in the library and the department reference room to ensure that users can be guided in the library and the department reference room.

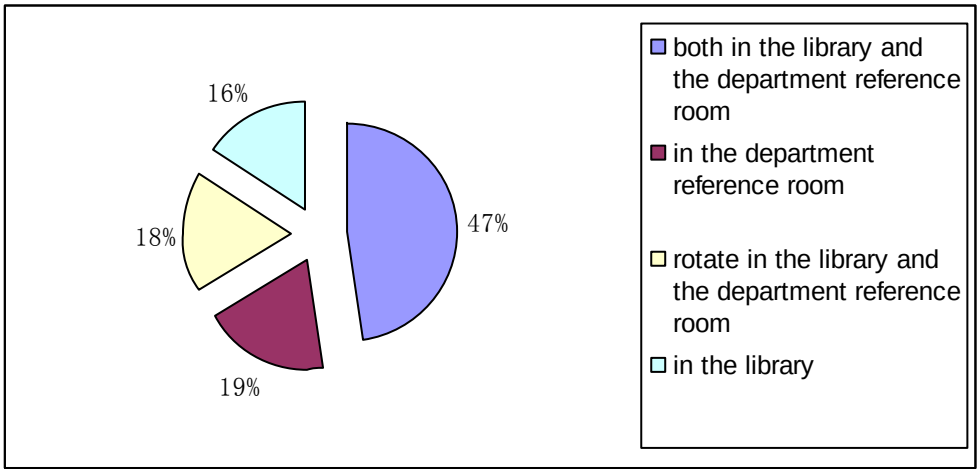

Figure 5 Users' Expectation of the Subject Librarian's Work Place

3.9 The Effective Communication Way between Subject Librarians and Science Users

Under network environment, the communication way between subject librarians and science users is very diverse.According to the survey（Table 5）, the best communication way between subject librarians and science users is E-mail(25.8%),whice is a formal communication way at present. QQ communication is widely welcome（19.6%）because it can realize real time communication and widely used in China.The subject librarians holding small-scale forum on a regular basis to know the needs reach 14.9%,indicating that face to face communication is an important way to obtain the subject information. At the same time ,the subject users have chance to express their views on the small-scale forum. In addition, telephone, subject information actively recommended by subject librarians,face to face talk with subject librarians in the department reference room, subject librarians understanding demands in the laboratory are effective communication ways. The subject librarians should observe and understand the communication ways that different level users like and can use multiple ways to communicate with users.The survey designed a choice "Please don' t disturb me " ,but nobody chose it.This shows that if subject librarians adopt proper communication ways, users are pleased.

Table 5 The Effective Communication Way between Subject Librarians and Science Users

The Effective Communication Way	Quantity	Percentage
E-mail	161	25.8
QQ real time communication(used widely in China)	122	19.6

small-scale forum on a regular basis	93	14.9
telephone	48	7.7
subject information actively recommended by subject librarians	46	7.4
face to face talk in the library	45	7.2
subject librarians understanding demands in the laboratory	42	6.7
face to face talk in the department reference room	36	5.8
inquiry demands by the subject librarians	18	2.9
MSN	12	1.9
please don' t disturb me	0	0.0

3.10 Science Users' Expectation of the Department Reference Room

In a sense, the library and the department reference room function differently. Table 6 shows science users expect that the department reference room collects more professional literature(26.8%),that they can borrow literature conveniently(24.0%) and that professional literature is comprehensive(22.7%). It can be seen that the department reference room's function is different from the library's. To some extent, the department reference room undertakes branch library of the subject.

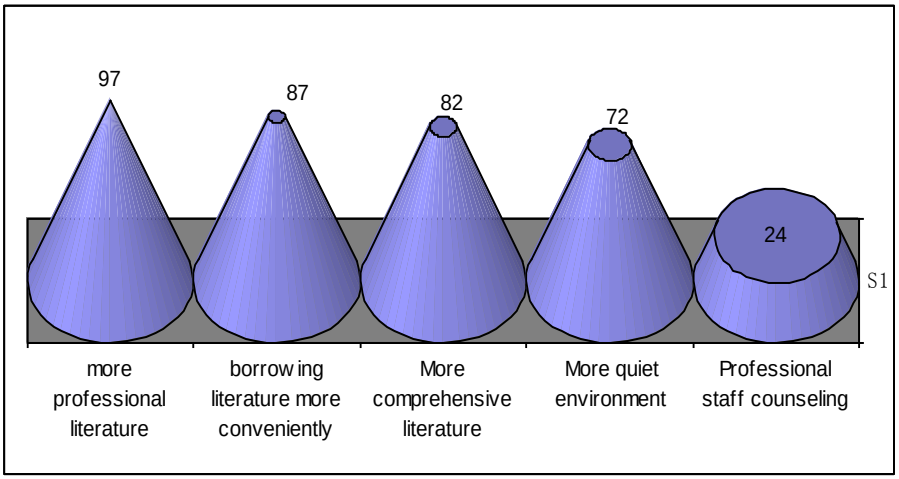

Figure 6 Science Users' Expectation of the Department Reference Room

4 The Strategies of Improving Service Effectiveness in Science Subject in University Library

In recent years, university library attaches importance to subject service.Each library should set up subject service direction according to the university's specialty settings, student-level, and find out the subject service ways suitable for the science users.

4.1 Understanding Users' Demand and Psychology to Provide Targeted Service

Users' demand is the most important driving force in subject service.Through listening to science users ' opinions and advice, knowing clearly their psychology,understanding their needs and habits, university library should probe into the development of resources and orientation of science subject service. The focus is to explore the subject service mode suitable for science subjects.

University library should exactly understand the "degree" in subject service and avoid "supply and demand imbalance" or " oversupply"[①]. Undergraduate students or graduate students or faculty are different in accepting the service.If possible,try to go into the class or science laboratory to understand their needs,then grasp the common character of a group of users. According to the needs,it's necessary to adjust the proportion of paper literature and electronic resources,adjust the proportion of paper books and paper journals in the library and the department material room.Sometimes,only give some users' instruction about the literature search method,but recommend other users the literature they need,and so on.

University library can establish service mechanism based on science subject character，such as establishing service tracking mechanism targeted at novelty searching project, and the citation analysis of international papers, tracking the academic and talented people's research, designing experienced items of science project, training the user's autonomous participation in library's service.

4.2 Constructing the Supporting System of Science Subject Service

Supporting System is the organization favorable for subject service development.On the one hand,university library should employ qualified subject librarians. Compared with the rapid technological development and information needs,the subject librarians' subject knowledge is relatively inadequate.So,It's important to improve and manage personal knowledge to keep pace with the times,promote novelty search capabilities for the research project.In all,the subject librarians should have the following attributes: self-confidence; strong communication abilities; being suitable for flexible working; capacity for computer and network; negotiations and persuasion ability; project management capabilities.On the other hand, university library should value the planning and design of subject service team. Reasonable subject service positions and work place must be set according to the users' needs. A service team including preliminary subject librarians, service-oriented librarians, research subject librarians should be constructed.That the subject service team members' knowledge structure and subject structure complement each other can have the effect of enhancing strengths.

4.3 Exploring Training Patterns and Contents Adapting to Science Users

Developing an interactive and cooperative information training mode suits the science users. Train all the science users,but put emphasis on training teachers' retrieval ability. We know that science subject users often work in the laboratory, the teachers transmit literature to the students or sometimes instruct them,and the laboratory fellow students help each other or exchange literature. We propose an effective training mode, that is, first, self-study library's training course,then subject librarian's guide, and at last professional teacher's instruction.

As for training contents, science users' demand largely embodies paper writing and submission (including the use of literature management software), sci-tech novelty retrieval methods， resource searching skills, selecting the thesis topic based on network resources,impact analysis for scientific achievements.In the training,more attention should be paid to paper writing,submission and the use of supporting document management software.

Acknowlegements

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[①] 范爱红,邵敏(2008). 清华大学图书馆学科馆员工作的新思路和新举措. *大学图书馆学报*, 01,56-60.